Old-growth acres remain constant through all benchmarks (with the exception of Benchmarks 1 and 3). Approximately 44,860 acres of old growth were selected to meet dispersion and habitat requirements for a minimum viable population of old-growth dependent species. Additional old growth is available in the wilderness, in the Pine Creek Further Planning Area, and in the Vinegar Hill-Indian Rock Scenic Area

The amount of bald eagle winter roost habitat (both potential and active) remains constant at 4,400 acres and potential peregrine falcon eyrie sites remain constant at four sites through all benchmarks (except Benchmarks 1 and 3)

d. Water

Water yield remains constant in all decades for all benchmarks

Sediment is a function of road construction and logging, no ties to range animal unit months or practices were attempted. Livestock grazing could have a substantial affect on sediment yield With the exception of the Maximum Anadromous Fish, Maximum PNV, and Minimum Level benchmarks, sediment tends to peak in the third decade which is due to the model building most roads in that decade Sediment yield figures were adjusted to reflect building roads into the majority of unroaded areas in the first decade However, the third decade peak persists, presumably due to road construction elsewhere

e. Fisheries

The benchmark analysis makes evident the following· (1) Anadromous fish production cannot be maintained at current levels without implementation of management practices designed to meet State water quality goals for temperature and turbidity; and (2) increases in anadromous fish production can be achieved by significant expenditures in riparian area improvements and/or by a significant reduction in riparian area management activities

D. RESULTS OF THE BENCHMARK ANALYSIS

As detailed in the previous section (Section C, Benchmark Analysis) in the text and summaries of outputs, the benchmarks produce varying environmental effects and resource output levels The modeling constraints for each benchmark have been previously discussed, the following section presents the results of the benchmark analysis. Most of the results are presented in an incremental fashion; i.e., differences in benchmarks are displayed in successive fashion. The analysis which follows is largely concerned with the following benchmarks: Minimum Level Management, Maximize Timber without Management Requirements (MRs) - Benchmark 1; Maximize PNV without MRs with Assigned Values - Benchmark 3; Maximize PNV with MRs with Assigned Values - Benchmark 7, and Maximize PNV with MRs with Market Values - Benchmark 11. The analysis completed for other benchmarks (Max AUM, Max Anadromous Fish, and Max Big Game), whose primary purpose was to generate upper production limits for specific resource outputs, was detailed in Section VI.C, Benchmark Analysis. The Current Situation benchmark is identical to the No Action Alternative which is discussed in Section VIII of this Appendix; consequently, the Current Situation Benchmark is not discussed in detail here

As stated before, the results of the benchmark analysis are based on the FORPLAN model used for the Draft Environmental Impact Statement, and have not been updated for changes included in the Final Environmental Impact Statement. This does not affect the comparability of the benchmarks with each other.

1. Economic Comparisons

Table B-25 displays major economic results of Benchmarks 1, 3, 7, 11, and Minimum Level The Present Net Value calculations for the benchmarks range from a high of $557 5 million for Benchmark 3 to a low of $67 9 million for the Minimum Level Benchmark. These economic comparisons have been updated from the Draft Environmental Impact Statement to reflect the revised Forest cost package. The largest changes in total discounted costs and benefits are related to management of the timber resource Correspondingly, benefits from range management will fluctuate as the timber output changes. Timber and forage production are part of the joint production structure of the forest ecosystem Forage production from the transitory range following a timber harvest will change as the number of acres cut and, therefore, the total volume harvested changes.

TABLE B-25
ECONOMIC COMPARISONS (Millions of 1982 Dollars)

Benchmark (ranked in order of decreasing PNV)	Present Net Value $MM	Present Net Value Change	Opportunity Cost	Benefits Discounted $MM	Benefits Discounted Change	Discounted Costs $MM	Discounted Costs Change	First Decade Payments to Counties $MM	First Decade Payments to Counties Change
BM-3	557 5		0	862 0		304.5		10.4	
		-30 5			- 3.1		+27 4		-0.9
BM-1	527.0		30 5	858.9		331 9		9 5	
		-54.4			-84.6		-30 2		-2 5
BM-7	472.6		84 9	774 3		301.7		7.0	
		-106.5			-106.5		0		0
BM-11	366 1		191 4	667 8		301 7		7 0	
		-298 2			-564 8		-266.6		-7.0
BM-Min	67 9		489 6	103 0		35 1		0	

TABLE B-25 (continued)
ECONOMIC COMPARISONS (Millions of 1982 Dollars)

Benchmark (ranked in order of decreasing PNV)	Decade 1 Gross Receipts	Gross Receipts Change	Net Receipts	Net Receipts Change	Noncash Benefits	Noncash Benefits Change
BM-3	41 8		25 4		4 3	
		-3 8		-6 0		+2.1
BM-1	38 0		19 4		6.4	
		-10 1		-5 5		-0 1
BM-7	27 9		13 9		6.3	
		0		0		-6.3
BM-11	27 9		13.9		0	
		-27 9		-13.9		+2.2
BM-Min	0		0		2 2	

BM-1 Max. Timber
Max. PNV/MRs (assigned values)
BM-Min Minimum level benchmark
BM-3 Max PNV BM-7
BM-11 Max. PNV/MRs (market values)

Tables B-26 and B-27 display the benchmarks ranked by increasing discounted costs and decreasing discounted benefits Also displayed in these tables are the costs or contributions to the totals by individual resource group. These tables are useful for evaluating the major sources of costs and benefits among the benchmarks.

TABLE B-26
COST COMPARISONS BY RESOURCE GROUP (MILLIONS OF 1982 DOLLARS)

Benchmark (ranked in order in increasing discounted costs)	Discounted Costs by Resource Group							
	Total Discounted Costs	Timber	Change	Wildlife	Change	Range	Change	Other Resource	Change
BM-Min	35.1	.2		0		.3		34 6	
			+166.8		0		+35.8		+58.1
BM-11	301.7	167.0		5.9		36.1		92 7	
			0		0		0		0
BM-7	301.7	167.0		5 9		36.1		92 7	
			+2 1		0		0		+0 7
BM-3	304.5	169.1		5.9		36 1		93.4	
			+20.3		0		0		+7.1
BM-1	331.9	189.4		5.9		36 1		100.5	

TABLE B-27
BENEFIT COMPARISONS BY RESOURCE GROUP (MILLIONS OF 1982 DOLLARS)

Benchmark (ranked in order of decreasing discounted benefits)	Discounted Benefits by Resource Group							
	Total Discounted Benefits	Timber	Change	Wildlife	Change	Range	Change	Other Resource	Change
BM-3	862.0	708.3		76.6		55 8		21.3	
			-7.2		+5.0		-0.7		-0.2
BM-1	858.9	701.1		81 6		55.1		21.1	
			-88.7		0		-0.2		+4 3
BM-7	774 3	612.4		81.6		54 9		25 4	
			0		-80.8		-0.3		-25 4
BM-11	667 8	612.4		0.8		54 6		0	
			-611.7		+75 8		-54.2		+25.3
BM-Min	103.0	0 7		76.6		0 4		25 3	

6/Primarily road construction, reconstruction, and maintenance related to timber management. Category includes general administration, fire protection, wilderness, lands, minerals, soil and water, and special use management

BM-1 Max. Timber BM-3 Max. PNV BM-7
Max. PNV/MRs (assigned values) BM-11 Max. PNV/MRs (market values)
BM-Min Minimum level benchmark

2. Physical Comparisons

A comparison of the physical outputs of the range of benchmarks is presented in Table B-28. The differences in the outputs of the benchmarks vary widely because of the characteristics of the benchmarks For example, the Minimum Level Benchmark projects physical outputs/effects on one extreme of the spectrum of possible Forest management strategies. Similarly, the Maximum Present Net Value without Management Requirements and Assigned Values Benchmark (BM-3) projects physical outputs/effects on the other extreme of the Forest management strategy spectrum Every benchmark has a different emphasis, which results in different mixes of goods and services Table B-28 displays the prominent physical outputs of the benchmarks

TABLE B-28
COMPARISON OF PHYSICAL CHARACTERISTICS OF THE BENCHMARKS

Benchmark (Ranked in order of decreasing PNV	First Decade Average Annual Timber Harvest MMBF	Change	Long-Term Sustained Yield Capacity MMCF	Change	Suitable Timber Lands 1,000 Acres	Change
BM-3	317 5		64 4		1,041.6	
		+ 9 1		+ 4 4		+3 3
BM-1	326 6		68 8		1,044 9	
		- 41 8		- 7 1		- 48.8
BM-7	284.8		61 7		996.1	
		0		0		0
BM-11	284 8		61 7		996.1	
		-284 8		N/A		+ 48 8
BM-Min	0		N/A		1,044.9	

TABLE B-28 (continued)
COMPARISON OF PHYSICAL CHARACTERISTICS OF THE BENCHMARKS

Benchmark (Ranked in order of decreasing PNV	Permitted Range Use 1,000 AUM	Change	First Decade Changes in Employment Jobs	Change	Unroaded Areas Retained 1,000 Acres	Change
BM-3	159		+ 830		0	
		- 2		+ 77		0
BM-1	157		+ 907		0	
		- 1		-353		0
BM-7	156		+ 554		0	
		0		0		0
BM-11	156		+ 554		0	
		-156		-2,506		+180 9
BM-Min	0		-1,952		180 9	

BM-1 Max. Timber BM-3 Max PNV BM-7
Max PNV/MRs (assigned values) BM-11 Max PNV/MRs (market values)
BM-Min Minimum level benchmark

TABLE B-28 (continued)

COMPARISON OF PHYSICAL CHARACTERISTICS OF THE BENCHMARKS

Benchmark (Ranked in order of decreasing PNV	Decade 1 Big-Game Use 1,000 WFUDs	Change	Decade 1 Anadromous Fish Use 1,000 WFUDs	Change	Decade 5 Old Growth Retained 1,000 Acres	Change
BM-3	72.1		22 3		0	
		+ 0 6		0		0
BM-1	72 7		22.3		0	
		+32 9		+1 4		+44 8
BM-7	105.6		23 7		44.8	
		0		0		0
BM-11	105.6		23 7		44 8	
		-56 5		+6 5		N/A
BM-Min	49.1		30.2		N/A	

BM-1 Max Timber BM-3 Max. PNV BM-7
Max PNV/MRs (assigned values) BM-11 Max PNV/MRs (market values)
BM-Min Minimum level benchmark

3. **Summary**

The following discussion details the tradeoffs occurring within individual benchmarks (e.g., in Benchmark 3, there are tradeoffs of physical outputs such as retained unroaded area acres or retained old-growth acres for higher timber harvests, which translates into higher Present Net Value). Also detailed are the differences between benchmarks. As an example, the differences between Benchmarks 3 and 7 are primarily the imposition of Management Requirements, which results in more acceptable resource management but some losses of economic efficiency (i.e., Present Net Value)

a. Benchmark 3

Benchmark 3 has the highest Present Net Value of all benchmarks, a logical result of the constraint set imposed on this benchmark and the corresponding objective function This benchmark determined the Maximum Present Net Value that could be generated by Forest management activities without Management Requirements. Timber policy constraints were utilized, however (i e , nondeclining flow, ending inventory requirements, and rotations based on 95 percent of culmination of mean annual increment) This benchmark has a lower timber harvest level than Benchmark 1 (Max Timber BM) but a higher net present value The reason for this difference is that the Max Timber Benchmark (BM 1) maintains timber harvest levels which incur higher discounted costs, and harvests smaller, lower-valued material (although total harvests are higher) For the Malheur National Forest, timber harvest and permitted grazing levels are the major resource elements generating Present Net Value

The maximization of Present Net Value with minimal consideration of nonpriced resources or outputs results in physical tradeoffs The tradeoffs result in near-maximal levels of priced commodity outputs (i.e , timber harvest and permitted grazing levels) at the expense of nonpriced resources. Examples of nonpriced resource tradeoffs under this benchmark include no acres of unroaded areas retained under unroaded management prescriptions, no acres of old growth retained intentionally, and less wildlife benefits than under Benchmarks 1 and 7 Range outputs are maximized (in comparison to Benchmarks 1, 7, 11, and Minimum Level Management, the Max animal unit month benchmark generates the absolute grazing capacity maximum). Benchmark 1 does not have Management Requirements to maintain State water quality standards As a result, anadromous fish production would decrease from the current level. Actual implementation (although not a possibility) would result in intensive and extensive timber management activities, a substantially lowered visual quality on the Forest, and reductions below acceptable levels in wildlife habitat for management indicator species

b. Benchmark 1

This benchmark generates less Present Net Value than Benchmark 3 but more than any of the other benchmarks. The objective of this benchmark is to establish the maximum amount of timber that can be harvested on a sustained yield basis on the Malheur National Forest. The Present Net Value loss ($30 million), when compared to Benchmark 3, is due to investments forced for timber production maximization that result in economic efficiency losses Of the benchmarks discussed here, Benchmark 1 incurs more discounted costs than any other, primarily timber-growing investments

The maximum outputs of timber harvests would support more employment opportunities than any other benchmark Similarly, the long-term sustained yield capacity of this benchmark is the highest of all benchmarks Suitable timber land acreage is higher than any other benchmark; correspondingly, there would be little opportunity to retain old-growth habitat or unroaded areas in their current condition Permitted grazing use would be high, reflecting the compatibility of timber harvesting and grazing on transitional range Resource damage may occur in some areas (e g., soil, water, wildlife) because of the intensity of timber management practiced throughout the Forest. Benchmark 3 does not have Management Requirements to maintain State Water Quality Standards As a result, anadromous fish production would decrease from the current level

c. Benchmark 7

Benchmark 7 is an important benchmark from a comparative standpoint This benchmark is used as the upper bound of economic efficiency for comparison to the alternatives considered in detail. Benchmark 7 provides a management strategy base for the generation of some alternatives, particularly the commodity-oriented *alternatives This benchmark also establishes the costs associated with* Management Requirements The adjustment for Management Requirements under this benchmark results in a substantial Present Net Value drop ($84 9 million), when compared to Present Net Value generated under Benchmark 3. These Management Requirements result in resource protection for wildlife, fish, soil, and water as required by NFMA regulations defined in 36 CFR And finally, this benchmark displays the value of resource outputs with assigned values ($106 5 million), this amount is the difference between Benchmark 7 and Benchmark 11 (Benchmark 11 is the Max PNV with MRs and Market Values Benchmark).

This benchmark results in a 13 percent reduction in timber harvest when compared to the Max Timber Benchmark (BM 1) When compared to the Max Present Net Value Benchmark (BM 3), the timber harvest reduction due to the implementation of Management Requirements is about 10 percent The drop in commodity outputs, namely timber harvest, results in less employment opportunities than under Benchmarks 1 and 3. Long-term sustained yield capacity and the acres of suitable timber land under this benchmark are correspondingly lower when compared to Benchmarks 1 and 3. Because of the implementation of Management Requirements, there are increases in wildlife habitat diversity as more acreage is dedicated to old growth. This benchmark does not dedicate any acres to unroaded area prescriptions; however, some old growth is retained to ensure compliance with the Management Requirements. Among the Management Requirements provided for in Benchmark 7 are those necessary to meet State water quality standards. One of the results of this is that anadromous fish production would be maintained at or near the current level.

d Benchmark 11

This benchmark is similar to Benchmark 7 with the exception that resource outputs *that do not have market values are not valued (i.e , do not contribute to Present* Net Value) This benchmark establishes the maximum Present Net Value that can be generated from Forest management activities when only resource outputs with market values are considered. Examples of resource outputs not valued under this benchmark include wildlife and fish user days, recreation visitor days, and wild horse grazing on the Forest. Gross receipts and payments to counties are the same as Benchmark 7 because the production of priced commodity outputs is the same.

The physical characteristics of this benchmark are similar to those of Benchmark 7. The similarities are due to the fact that Benchmarks 7 and 11 have essentially the same management strategy and corresponding resource outputs, the major difference is the identification of the Present Net Value of resource outputs without market values.

e Minimum Level Management

This benchmark establishes the minimum funding level required for the Forest and the associated tradeoffs that would be required if this benchmark were in effect The costs of this benchmark are the lowest of all benchmarks and alternatives; annual Forest expenditures would be $1 4 million which is 12.6 percent of the average Forest budget in recent years (1983-85). The opportunity cost if the Forest were managed at this level is very high, $481.1 million. The high opportunity costs are primarily due to foregone timber harvests and permitted grazing prohibition The employment impacts on the Forest zone of influence would result in large decreases.